University Council

January 9, 2026

UNIVERSITY CURRICULUM COMMITTEE – 2025-2026
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Dear Colleagues:

The attached proposal from the Franklin College of Arts and Sciences for a new Undergraduate Certificate in Industrial Bioscience Skills will be an agenda item for the January 16, 2026, Full University Curriculum Committee meeting.

Sincerely,

Susan Sanchez, Chair

cc: Provost Benjamin Ayers
Dr. Marisa Anne Pagnattaro

PROPOSAL FOR A CERTIFICATE PROGRAM

Date: November 3, 2025

School/College/Unit: Franklin College of Arts and Sciences

Department/Division: Microbiology

CIP: 26120100

Certificate Title: Industrial Bioscience Skills

Effective Term: Fall 2026

Which campus(es) will offer this certificate? Athens

Level (Undergraduate, Graduate, or Post-Baccalaureate): Undergraduate

Program Abstract:

The proposed Undergraduate Certificate in Industrial Bioscience Skills is a program designed to equip students with the advanced technical competencies, communication expertise, and professional readiness essential for success in the rapidly evolving bioscience industry. Leveraging existing courses, expert instructional personnel, and state-of-the-art research laboratories, the curriculum offers a rigorous and immersive educational experience.

Participants will gain hands-on proficiency in cutting-edge laboratory techniques, data analysis, and experimental design, while also developing strong written and oral communication skills tailored to scientific and professional contexts. The program emphasizes real-world applications and career preparation through integrated coursework and experiential learning opportunities.

Upon successful completion, students will possess a robust suite of skillsets highly sought after by employers in biotechnology and related fields, positioning them for competitive entry into the workforce or advanced academic pursuits.

1. Purpose and Educational Objectives

State the purpose and educational objectives of the program. How does this program complement the mission of the institution?

The purpose of this proposed program is to prepare life science undergraduates for successful careers in the bioscience industry by providing advanced laboratory training, strong communication and data analysis skills, and professional development through a structured 12-15 credit hour curriculum utilizing existing courses. Students who choose to participate in this certificate and enter professional and graduate programs would also benefit from the multidisciplinary skillsets offered.

In alignment with the Experiential Learning requirement for UGA students, this program has a heavy emphasis on advanced laboratory skills through hands-on learning in current biotechnology techniques, experimental design, and data analysis using available research labs and facilities. Additionally, students who participate in these inquiry-driven lab experiences will not only gain valuable hard skills at the bench but also soft skills in working collaboratively with peers.

One of the university's Institutional Competencies is communication which conveys UGA's recognition that successful graduates articulate and exchange ideas effectively. The certificate requires students to develop their scientific communication through courses that emphasize written reports, oral presentations, and professional interactions.

Critical thinking and analytical skills are reinforced not just through the lab courses but also computational courses such as bioinformatics, programming basics, and foundations of artificial intelligence. This two-fold approach to enhance evaluative skills deepens students' knowledge base and confidence to approach real-world problems.

Career readiness is emphasized to prepare students for the workforce by introducing students to potential bioscience jobs, effective job application materials such as resumes, and the value of networking. This ensures graduates will possess a competitive skillset as well as effective application materials, enabling them to pursue employment or further academic study in industrial bioscience and related fields.

2. Need for the Program

Explain why this program is necessary.

The bioscience industry is expanding, driven by advances in genomics, personalized medicine, agricultural biotech, and bio-manufacturing. Employers in this sector are increasingly seeking job-ready graduates with practical lab experience, and strong communication and teamwork skills. This certificate directly addresses those needs, producing graduates who are immediately employable and competitive in a high-demand job market. The proposed certificate is a strategic response to the demand for skilled biotechnology professionals. It ensures that students are not only academically prepared but
also professionally equipped to thrive in an evolving industry.

According to the US Bureau of Labor Statistics, job trends in bioscience-related technology and industry jobs that include biological technicians are estimated at 7% growth over the next 10 years.[1] In light of this growth in bioscience industry jobs, a survey was collected from twelve (12) local bioscience and technology company directors and supervisors. They indicated that lab experience with skillsets that included PCR and cell culturing technique were important qualities of a desirable employee. Skills such as accurate data analysis, recording accurate documents, maintaining quality control, and competency in experimental design received an average score of 4 out of a 5 point scale, indicating a very desirable characteristic. Soft skills highly rated were written and oral communication, critical thinking, and time management. The highest skill rated in this survey was collaboration.

Concurrently, according to the Georgia Department of Education, the number of STEAM and STEM high schools are increasing. There are seven (7) established STEM schools with ten (10) advancing to certification and fifteen (15) more that are beginning the process of certification.[2] This trend of more students accessing STEAM and STEM schools will in turn provide more interest in certification programs such as the proposed Undergraduate Certificate in Industrial Biosciences Skills.

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[1] https://www.bls.gov/ooh/life-physical-and-social-science/biological-technicians.htm

While traditional life science major programs provide a strong foundation in biological theory and scientific principles, this proposed certificate program adds layers of structured, hands-on training and career-focused preparation that today's bioscience employers demand. This certificate program is uniquely positioned to prepare students for this field by offering applied skill development: students gain real-world lab experience with advanced techniques not always covered in standard coursework. Emphasis on industry-relevant tools and protocols prepares students for immediate entry into bioscience roles in private and public sectors. Unlike many science programs, this certificate also integrates scientific writing, presentation skills, and teamwork, ensuring graduates can communicate effectively in professional settings. Finally, the certificate requires career development training which helps students explore and define career paths in biotechnology, regulatory affairs, lab management, and more.

The Undergraduate Certificate in Industry Bioscience Skills is designed to complement any life science major without extending time to graduation. It utilizes existing UGA courses and labs, many which overlap life science major and minor programs. In essence, this certificate transforms a traditional life science education into a career-launching platform, equipping students with the practical skills and credentials to enter the biosciences technology workforce.

a. **Semester/Year of Program Initiation:** Fall 2026.
b. **Semester/Year of Full Implementation of Program:** Fall 2026
c. **Semester/Year First Certificates will be awarded:** Spring 2027
d. **Annual Number of Graduates expected (once the program is established):** 97
e. **Projected Future Trends for number of students enrolled in the program:**

As this certificate would be of interest to life science students, if 5% of current Biology (B.S.) and Microbiology (B.S.) students apply for the certificate program, the estimated number of enrollment would be 97 students, based on the total enrollment from Spring 2024 being 1936. If this certificate program shows growth over the next five years where 8-10% of Biology (B.S.) and Microbiology(B.S) students apply for the certificate program, the estimated number of enrollment would increase to approximately 155-194 students.

3. Student Demand

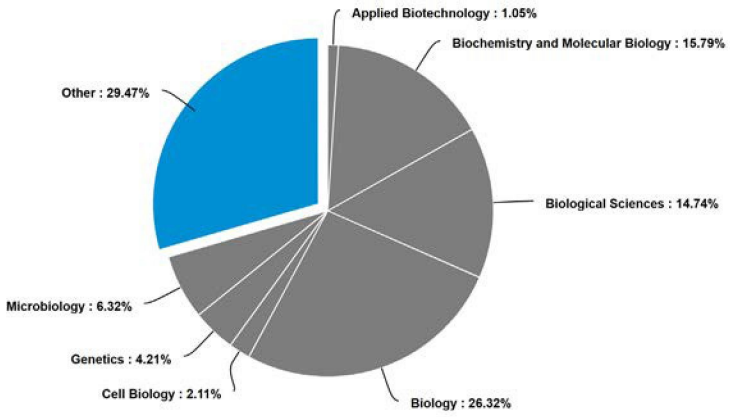
a. Provide documentation of evidence of student demand for this program, including a student survey.

In light of the changing landscape with federal fellowships and internships, more students with bioscience training will be looking for jobs in industry. Students are looking for programs that provides practical, industry-relevant skills (e.g., lab techniques and data analysis) which complement a biology degree that provide a more competitive edge for entry-level jobs as compared to peers. Additionally, many biology majors are unsure how their academic knowledge translates into careers. Thus, a certificate program becomes beneficial as it bridges this gap by showing clear links between classroom learning and bioscience careers.

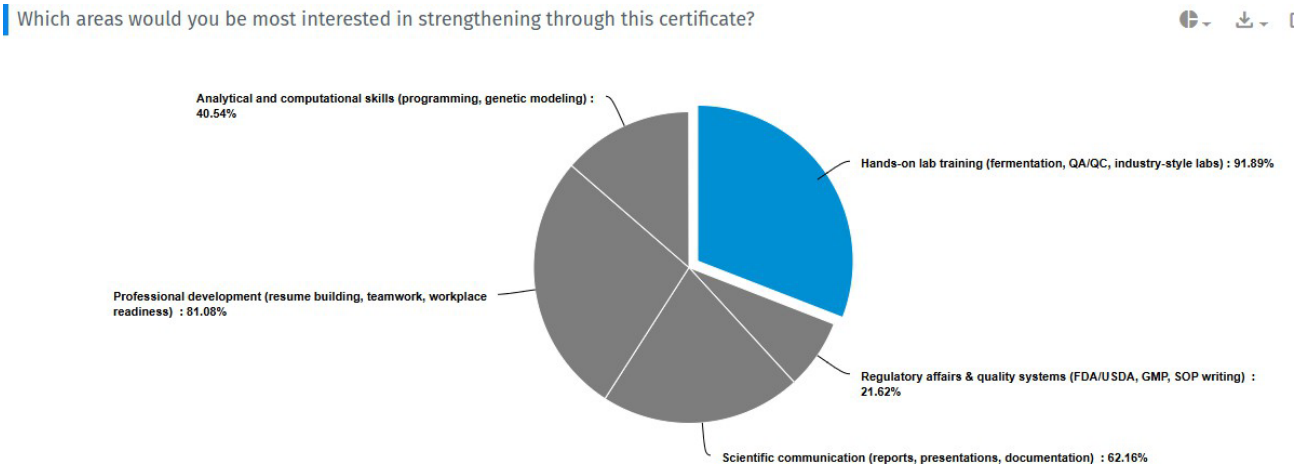
[2] https://lor2.gadoe.org/gadoe/file/299fb8ec-bc81-464d-a416977da9bdc34f/1/STE%28A%29M%20Tiered%20School%20List.pdf

The following survey questions were posed to students from a variety of majors (see pie chart below) enrolled in MIBO 3500, BIOL 1107, and BIOL 1108 courses gauging student insight on the desirability of a such as certificate program as well as the type of skills they are seeking. Of the 94 undergraduate majors who responded to the survey, 77.6% indicated they would consider pursuing the proposed Undergraduate Certificate in Industrial Bioscience Skills.

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I` would consider pursuing the Certificate in Industrial Bioscience Skill if it were offered	0	2	19	45	28
	0.00%	2.13%	20.21%	47.87%	29.79%
A certificate like this would make me more competitive for jobs and support my career goals.	0	0	8	50	36
	0.00%	0.00%	8.51%	53.19%	38.30%
The skills taught in this certificate (hands-on labs, scientific communication, analytical skills, professional development) would be valuable to me.	0	0	5	41	48
	0.00%	0.00%	5.32%	43.62%	51.06%



Additionally, students were asked to select which skills they would be most interested in strengthening if the proposed certificate was offered. An overwhelming 91% indicated hands-on lab training was most attractive with 81% indicating professional development as the next most desirable.



b. Provide evidence that demand will be sufficient to sustain reasonable enrollment.

According to the UGA Career Center, 35% of Biology majors go straight into full-time positions, such as laboratory technicians, upon graduation.[3] As mentioned earlier, if five percent (5%) of current Biology and Microbiology students apply for the certificate program, the estimated number of enrollments would be 97 students (total enrollment from Spring 2024 being 1936). This estimate provides evidence for sufficient enrollment to maintain this certificate program. If enrollment in the certificate exceeds expectations, the increase in student enrollment can be mediated by restricting applications to only those who have finished BIOL 1107/L, BIOL 1108/L, CHEM 1211/L and CHEM 1212/L courses with a "C+" (2.3) or better and/or adding the course MIBO 3500 and MIBO 3500L as a prerequisite with a "C" (2.0) or better.

4. Program of Study

Provide a detailed program of study for the certificate program.

Required Course (3 hours):

MIBO 3510L, Introduction to Microbiology Laboratory II (3 hours) (Prerequisites: MIBO 3500, MIBO 3500L)

Lab Skills Courses (3-4 hours)

Choose one of the following:

BCMB 4030L, Bioprocess Technology (4 hours)
BIOL 3110L, Basic Skills in the Laboratory (4 hours)
BTEC(BCMB)(PBIO) 4000L, Methods in Biotechnology (4 hours)
CBIO 3410L, Laboratory in Cellular and Developmental Biology (4 hours)
GENE 3210L, Experimental Genetics (3 hours)
GENE 4210L, Experimental Molecular Genetics Laboratory (3 hours)
MIBO 4600L/6600L, Experimental Microbiology Laboratory (4 hours)
BCMB 4960R, Faculty-Mentored Undergraduate Research I (3-4 hours)
BIOL 4960R, Faculty-Mentored Undergraduate Research I (3-4 hours)
CBIO 4960R, Faculty-Mentored Undergraduate Research I (3-4 hours)
GENE 4960R, Faculty-Mentored Undergraduate Research I (3-4 hours)
MIBO 4960R, Faculty-Mentored Undergraduate Research I (3-4 hours)
PBIO 4960R, Faculty-Mentored Undergraduate Research I (3-4 hours)

[3] https://career.uga.edu/wcidwami/biology

Data Analysis Courses (3-4 hours)
Choose one of the following:

ARTI 2550, Thinking Machines: Foundations of Artificial Intelligence (3 hours)
CSCI 1300-1300L, Introduction to Programming with Python (4 hours)
GENE 4220L, Laboratory in Genetic Modeling (3 hours)
INFO 2000, Experiential Data Science Specialization – Foundations (3 hours)
MIBO(POPH)(IDIS) 4450/6450-4450L/6450L, Microbial Genetics and Genomics (4 hours)

Scientific Communication Courses (2-3 hours)
Choose one of the following:

BIOL 4300W/6300W, Scientific Research Writing (3 hours)
BTEC 3000, Ethics and Communication in Biotechnology (2 hours)
COMM 4350/6350, Scientific Communication (3 hours)
ENGL 3860W, Science Writing for General Audiences (3 hours)

Professional Development Course (1 hour)
Choose one of the following:

BIOL 3050, Professional Development for Biology Careers (1 hour)
CBIO(NEUR)(PSYC) 4950, Career Development in Neuroscience (1 hour)
FDST 1001, Careers in Food Science (1 hour)

Total = minimum of 12 hours

b. Identify any new courses created for this program

No new courses are needed for this certificate program.

5. Model Program and Accreditation

Across the U.S., several universities offer specialized programs tailored to diverse career paths in biomanufacturing and biosciences. South Dakota State University (SDSU) provides a Bioprocessing Sciences Certificate requiring one foundational course and lab, plus two electives from a broad selection of 33 options. Sample electives include Food Microbiology, Engineering Properties of Biological Materials, and Microbial Processes in Engineering and Natural Sciences. North Carolina State University (NC State) offers both a Minor and a Certificate in Biomanufacturing. The minor includes four core courses such as Introduction to Drug Development and Careers in Biomanufacturing and Fermentation of Recombinant Microorganisms, with electives like Industrial Microbiology and Bioprocessing and Animal Cell Culture Engineering. The certificate program is more streamlined, requiring fewer credits but still offering electives like Molecular Biology for Biomanufacturing and Microbial Biotechnology. University of Massachusetts (UMass) offers a Biotechnology Certificate through its Department of Microbiology, emphasizing hands-on experience via a required internship or independent study. Students choose from introductory courses such as Cellular and Molecular Biology, lab courses like Laboratory in Biotechnology, and electives including Microbial Genetics and Phyto/Bioremediation. Each program reflects a distinct approach; whether emphasizing lab work, industry alignment, or academic breadth, these programs cater to students aiming for careers in biotechnology and related fields.

However, only one of these programs includes a professional development requirement and none include scientific communication courses. Additionally, while all of these programs offer intense wet lab training, few of these programs include specific data analysis courses that include any topics that include generative AI components or computer programming.

No accreditation program is offered for multidisciplinary biosciences programs.

6. Student Learning Outcomes

Describe the proposed learning outcomes for the certificate program.

LO1. Lab skills proficiency – students will be able to demonstrate mastery in advanced laboratory techniques, including molecular biology, cell culture, and analytical instrumentation.

LO2. Scientific evaluation and application – students will be able to analyze and interpret experimental data using appropriate scientific methods and tools along with critically evaluating scientific literature to draw valid conclusions. Students will also integrate and apply interdisciplinary knowledge from biology, chemistry, and technology to solve real-world problems.

LO3. Scientific communication – students will be able to communicate scientific information effectively and accurately through written reports, oral presentations, and digital media tailored to both technical and non-technical audiences.

LO4. Career readiness – students will identify ways to investigate potential career outcomes while developing career-readiness artifacts such as online portfolios, resumes, or CVs.

7. Assessment and Admissions

Describe how the learning outcomes for the program will be assessed.

Learning Outcome	Program Assessment
LO1. Lab skills proficiency	Evaluation of lab skill proficiency by practical exams or guided projects: MIBO 3510L, BIOL 31110L Lab practical exams, evaluation of lab notebooks, and lab reports scores: MIBO 3510L Scores from lab assignments and lab activities in electives lab courses that assess bench skills: BCMB 4030H/4030L, BIOL 3110L, BTEC 4000L, CBIO 3410L, GENE 4210L, GENE 3210L, MIBO 4600L
LO2. Scientific evaluation and application	Evaluation of data analysis in final research paper: BCMB 4960R, BIOL 4960R, CBIO 4960R, GENE 4960R, MIBO 4960R, PBIO 4960R Assignments and project scores in data analysis courses: BCMB 4030H/4030L, BIOL 3110L, BTEC 4000L, CBIO 3410L, GENE 4210L, GENE 3210L, MIBO 4600L Score from data interpretation in final project/report: MIBO3510L,MIBO 4600L
LO3. Scientific communication	Scores from assessments on final papers: BIOL 4300W, ENGL 3860W Oral presentation assessments: BTEC 3000, COMM 4350/6350 Evaluation of writing proficiency in final research paper: BCMB 4960R, BIOL 4960R, CBIO 4960R, GENE 4960R, MIBO 4960R, PBIO 4960R

LO4. Career readiness	Pre- and post-course anonymous student survey about self-perceived career preparation: BIOL 3050, CBIO(NEUR)(PSYC) 4950, FDST 1001 Assessment of professional artifacts: BIOL 3050, CBIO(NEUR)(PSYC) 4950, FDST 1001 Anonymous survey of recently graduated alumni about career preparation

Describe the process and criteria for how students will be admitted to and retained in the program.

Students can apply online to the Undergraduate Certificate in Industrial Biosciences Skills through the Microbiology department's website. Students with an overall 3.0 GPA or higher who have completed each of the courses listed below with a grade of "C" (2.0) or better will be admitted.

BIOL 1107, Principles of Biology I (3 hours)
AND BIOL 1107L, Principles of Biology I Laboratory (1 hour)
BIOL 1108, Principles of Biology II (3 hours)
AND BIOL 1108L, Principles of Biology II Laboratory (1 hour)
CHEM 1211-1211D, General Chemistry I (3 hours)
AND CHEM 1211L, General Chemistry Laboratory I (1 hour)
CHEM 1212-1212D, General Chemistry II (3 hours)
AND CHEM 1212L, General Chemistry Laboratory II (1 hour)

Departmental efforts to retain students in the program will be done by regular communication through email and social media, as well as hosting events for career networking and community building.

Documentation of Approval and Notification

Proposal: Undergraduate Certificate in Industrial Bioscience Skills

College: Franklin College of Arts and Sciences

Department: Microbiology

Proposed Effective Term: Fall 2026

School/College:

- Head of the Department of Microbiology, Dr. Aaron Mitchell, 10/28/2025
- Franklin College of Arts and Sciences Associate Dean, Dr. Paula Lemons, 12/16/2025

Use of Course Notifications:

- Director of the School of Computing, Dr. Gagan Agrawal, 1/8/2026
- Head of the Department of Genetics, Dr. Michael Arnold, 10/27/2025
- Head of the Department of Biochemistry and Molecular Biology, Dr. Adam Barb, 10/2/2025
- Head of the Department of Plant Biology, Dr. John Burke, 1/8/2026
- Interim Head of the Department of Food Science and Technology, Dr. Faith Critzer, 11/3/2025
- Executive Director of the Institute for Artificial Intelligence, Dr. Prashant Doshi, 1/8/2026
- College of Engineering Assistant Dean, Dr. Mable Fok, 1/8/2026
- Director of the Georgia Informatics Institutes, Dr. Kyle Johnsen, 11/5/2025
- Professor of Cellular Biology, Dr. Edward Kipreos, 10/13/2025
- College of Agricultural and Environmental Sciences Associate Dean, Dr. Dean Kopsell, 9/29/2025
- Head of the Department of Cellular Biology, Dr. James Lauderdale, 10/13/2025
- Director of the Division of Biological Sciences, Dr. Kristen Miller, 10/5/2025
- Undergraduate Coordinator for the Department of Communication Studies, Dr. Chelsea Ratcliff, 9/26/2025
- Head of the Department of English, Dr. Roland Végső, 10/2/2025